

REMARKS

Claims 1-6, 8, 9 and 11 are currently amended. Support for the amended claims can be found throughout the specification, specifically in the claims as originally filed. No new matter has been added. Claims 1-11 are currently under consideration.

Claim Objections

Claims 1-6 and 9 are objected to because of informalities. See Office Action page 2. These claims have been amended to correct the informalities. Withdrawal of the Objection is respectfully requested.

Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 8, 9, and 11 are rejected under U.S.C. §112, second paragraph as having insufficient antecedent basis. See Office Action page 2. Claims 8 and 9 have been amended to depend on claim 7, and claim 11 has been amended to depend on claim 10. Withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. §102(b)

Claims 1-3 and 10-11 are rejected under 35 U.S.C. §102(b) as being anticipated by Burgmair *et al.* (Proceedings of IEEE Sensors 2002, pg. 439-442; hereinafter "Burgmair"). The Examiner contends that Burgmair teaches all of the elements of the present claims. See Office Action pages 3-4.

Applicants respectfully disagree and traverse the rejection. To anticipate, a prior art reference "must disclose each and every feature of the claimed invention, either explicitly or inherently." MPEP §2131; *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir. 1995). Burgmair does not anticipate the present invention because this reference does not teach all the limitations of the hydrophobic layer as recited in currently amended claim 1.

Burgmair describes the effect of a guard ring for suppression of baseline drift induced by humidity. The gas sensor has a silicon nitride layer (Si₃N₄) which has on its surface a silicon dioxide layer (SiO₂). See Figure 2. A final layer is formed when the silicon nitride layer comes into contact with aerial oxygen.

As illustrated in the included abstract (available at <http://www.uni->

saarland.de/fak7/hartmann/files/docs/pdf/teaching/lectures/talks/WS0506/WoopLechthaler-FunkOberl.pdf), the contact angle of an untreated silicon nitride layer is about 60°. Therefore, the layer is not a hydrophobic layer as a hydrophobic layer according to the invention has a contact angle, by definition, of at least 90°.

Amended claim 1 now recites, in part:

...A hydrophobic layer is arranged on the surface of the gas sensor next to the gas sensitive layer and the channel area and/or a sensor electrode, which is electrically connected to a gate electrode arranged on the channel area whereby the static contact angle of the hydrophobic layer measured with water and obtained on a planar surface is at least 90°.

The resulting gas sensor limits or eliminates the adsorption of humidity on the surface of the FET, thus drastically raising the conduction of the sensor surface. The gate insulator as disclosed in Figure 2 of Burgmaier is clearly not a hydrophobic layer.

In addition, Burgmaier teaches the presence of a thin film of water at the surface of the passivation layer. See p. 440, left column, last paragraph. In contrast to the present invention, Burgmaier teaches a guard ring, which is maintained at a constant electric potential and which surrounds the area of the channel, to prevent charges from entering or leaving the area. See page 440, right column, first paragraph.

Burgmaier does not teach or suggest the hydrophobic layer of the currently amended claims and therefore clearly does not teach each and every element of independent claim 1. Applicants respectfully request withdrawal of the rejection.

Claims 2-11 are dependent on amended claim 1 and therefore incorporate all of the limitations of that claim. For the reasons discussed above in connection with amended claim 1, claims 2-11 are also in condition for allowance.

Rejections Under 35 U.S.C. §103(a)

Burgmaier in view of Ruther

Claim 4 is rejected under 35 U.S.C. §103(a) as being obvious over Burgmaier in view of Ruther *et al.* (Proceedings of IEEE Sensors 2003, Vol. 2, pg. 920-925; hereinafter "Ruther"). The Examiner states that Burgmaier teaches all of the limitations of claim 4 with the exception of (1) the separation of the hydrophobic layer from the channel area and/or the sensor electrode; and (2) the hydrophobic layer delimits that channel area and/or the sensor

electrode in a ring or frame like manner. The Examiner contends that Ruther satisfies this deficiency. The Examiner then concludes that it would have been obvious to separate the sensor electrode in the gas sensor of Burgmair, as taught by Ruther, because doing so enhances signal response when the sample gas is at a higher relative humidity. See Office Action pages 5-6.

Applicants direct the Examiner's attention to the included abstract of Ruther, which indicates that this reference was originally published on October 22-24, 2003. The priority date for the present application is July 30, 2003, which precedes the Ruther publication date. Thus, Ruther is not a proper reference 35 U.S.C. §103(a). As stated by the Examiner, Burgmair does not disclose all of the elements of claim 4. Burgmair neither anticipates nor makes obvious the presently claimed invention. Withdrawal of the rejection is respectfully requested.

Burgmair in view of Usui

Claim 5, 7 and 8 are rejected under 35 U.S.C. §103(a) as being obvious over Burgmair in view of Usui *et al.* (Proceedings of the 7th International Conference on Properties and Applications of Dielectric Materials, June 1-5, 2003, page 104-107; hereinafter "Usui"). The Examiner concedes that Burgmair does not describe the static contact angle of the hydrophobic layer as currently set forth in claim 5. The Examiner states that Usui cures this deficiency. The Examiner then concludes that it would have been obvious to combine the reference as selection of the hydrophobic layer of Usui would be an obvious design choice. See Office Action pages 6-7.

Applicants respectfully traverse the rejection. The recently revised Examiner guidelines for assessing obviousness set forth detailed requirements based on asserted rationales for obviousness. The Rationales To Support Rejections Under 35 U.S.C. §103 provide the following possible rationale:

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

See MPEP §2141.

The MPEP further sets forth the requirements for an obviousness rejection under this rationale:

To reject a claim based on [rationale G], Office personnel must resolve the Graham factual inquiries. Then, Office personnel must articulate the following:

(1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;

See MPEP §2143

Usui does not cure the deficiencies of Burgmair as described above. Usui describes the preparation of fluorinated polymeric thin films by ion-assisted deposition. Usui neither teaches nor suggests a suspended gate sensor or a field effect transistor with a source, a drain and a gate electrode. In addition, Usui does not teach the hydrophobic layer as currently recited in amended claim 1.

The features of the gas sensor of the present invention are not present in the combination of the two references. The references are not properly combined because neither Burgmair nor Usui teaches or suggests the hydrophobic layer of the present invention. Contrary to the Examiner's contention, a person of ordinary skill in the art would not expect that the combination would provide for the reduction or prevention of the adsorption of humidity on the surface of the FET. Therefore, 5, 7 and 8 are not obvious over the combination of Burgmair or Usui. Applicants respectfully request withdrawal of the rejection.

Burgmair in view of Usui and Yang

Claims 6 and 9 are rejected under 35 U.S.C. §103(a) as being obvious over Burgmair in view of Usui and further in view of Yang (U.S. Patent No. 6,670,286). The Examiner states that modified Burgmair does not disclose that the molecules of the hydrophobic layer are covalently bound to the surface of the insulating layer. The Examiner contends that Yang cures this deficiency. The Examiner then concludes that it would have been obvious to combine the photopolymerization fabrication method of modified Burgmair with the Yang method because the modification allows patterning of multiple regions of selected film. See Office Action pages 8-9.

Applicants respectfully traverse the rejection and contend that Yang does not cure the deficiencies of Burgmair and Usui. Yang discloses a photopolymerization method to

attach microsensor film to an oxide surface. The method includes the steps of (1) pre-treating the oxide surface; (2) coating the pretreated surface with a pre-polymer solution; and (3) polymerizing the pre-polymer solution with ultraviolet light to form the microsensor film. As described above for the prior references, there is no teaching or suggestion of the hydrophobic layer as currently recited in amended claim 1. These three references are clearly not properly combined because none teaches or suggests the hydrophobic layer recited in currently amended independent claim 1. A person of ordinary skill in the art would not expect that the combination would provide for the reduction or prevention of the adsorption of humidity on the surface of the FET. The combination of Burgmair, Usui and Yang do not render claims 6 and 9 obvious. Withdrawal of the rejection is respectfully requested.

CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that all pending claims are allowable. Accordingly, reconsideration of the rejections and allowance of claims 1-11 are respectfully requested.

Respectfully submitted,

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